



Microstructure and thermoelectric properties of misfit-layered cobalt oxides with metallic nanoinclusions prepared by a printing technique

Van Nong, Ngo; Samson, Alfred Junio; Pryds, Nini; Linderorth, Søren

Published in:
Abstract book

Publication date:
2011

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):

Van Nong, N., Samson, A. J., Pryds, N., & Linderorth, S. (2011). Microstructure and thermoelectric properties of misfit-layered cobalt oxides with metallic nanoinclusions prepared by a printing technique. In *Abstract book* (pp. 279-279)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

P41. Microstructure and thermoelectric properties of misfit-layered cobalt oxides with metallic nanoinclusions prepared by a printing technique

Ngo Van Nong, Alfred Junio Samson, Nini Pryds and Søren Linderorth

Fuel Cells and Solid State Chemistry Division, Risø National Laboratory for Sustainable Energy, Denmark Technical University, 4000 Roskilde, Denmark

In order to broaden the use of thermoelectric (TE) materials for practical application as an electric power generator from waste heat, simple, cheap and reliable methods for producing materials and thereof TE elements must be considered and demonstrated. We have employed a printing technique, which is cheap and easy to carry out, to prepare p-type TE-tapes (TE materials on a ceramic substrate) using nano-scale misfit-layered cobalt $\text{Ca}_3\text{Co}_4\text{O}_9$ oxide materials with metallic nanoinclusions. The TE-tapes were sintered in air at various temperatures and holding time. After each sintering process, microstructure observation by a scanning electron microscopy (SEM) and crystal structure through the X-ray diffraction analysis were carried out in order to find an optimal sintering condition. The thermoelectric properties were characterized from room temperature up to about 1000 K. We found that the maximum power factor was improved about 67% ($3.10 \times 10^{-4} \text{ Wm}^{-1}\text{K}^{-2}$) for the tape with a proper of silver (Ag) metal nanoinclusions as compared to ($1.86 \times 10^{-4} \text{ Wm}^{-1}\text{K}^{-2}$) for the counterpart without metallic nanoinclusions under the same sintering condition at 950 °C. The thermoelectric properties and thermal stability of TE-tape is further improved by a subsequent hot-pressed sintering process.